

# PATENT SPECIFICATION

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 (72) Inventor: REGINALD SIDNEY WEBLEY

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## (54) IMPROVEMENTS IN OR RELATING TO DISCHARGE TUBES

(71) We, E.M.I. LIMITED, a British company of Blyth Road, Hayes, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a discharge tube, in particular to a discharge tube containing carbon monoxide and/or carbon dioxide.

Prior discharge tubes filled with carbon monoxide and/or carbon dioxide have suffered from a short useful lifetime due to dissociation of the contained gases into their constituent elements during use of the tube.

It is an object of this invention to provide an improved discharge tube with a useful lifetime.

According to the invention there is provided a discharge tube containing carbon monoxide and/or carbon dioxide and further containing a carbon filament which is provided with an electrical connection to the outside of the tube, whereby an electrical heating current is applicable to the filament.

The tube may also contain a source of oxygen having an electrical connection to the outside of the tube.

In order that the invention may be clearly understood and readily carried into effect the same will now be described by way of example only with reference to the drawing accompanying the provisional specification, the single Figure of which shows a discharge tube according to one example of the invention.

Referring now to the Figure the discharge tube comprises a housing 1, which is transmissive to the radiation arising from the gas discharge, enclosing a space, 2. Contained in the housing, 1, are two metallic electrodes 3 and 4 with respective electrical connections 5 and 6, sealed in the housing wall. The space, 2, is filled to a predetermined pressure with carbon monoxide

and/or carbon dioxide.

Also mounted in the tube is a carbon filament, 7, with external electrical connections 8 and 9. A second filament may be incorporated which comprises an oxygen generator such as potassium chlorate.

The operation of the tube is as known in that a high voltage supply is connected to the electrodes 3 and 4 and a glow discharge occurs. However with known tubes after some use the levels of the oxides of carbon fall due to their breakdown into constituent elements and the tube becomes inefficient. To regenerate the oxides of carbon, a heating current is applied to the carbon filament and/or to the filament comprising potassium chlorate to cause it/them to glow, hence to produce and/or regenerate the oxides of carbon. The carbon filament may also be used to give an indication of the gas pressure within the tube when used in the manner of a Pirani gauge.

The tube has applications as a source of radiation in the infra red region, and may conveniently be used in a carbon monoxide/carbon dioxide detector such as described in UK Patent No. 1398977, as it provides infra red radiation at the required wavelengths, as is useful in the detection of combustion products for a fire detector. The carbon filament may be incorporated as one of the main electrodes. The carbon filament (and or the oxygen generator if desired) may be arranged to selectively or continuously provide the carbon and/or oxygen for the regeneration cycle.

### WHAT WE CLAIM IS:-

1. A discharge tube containing carbon monoxide and/or carbon dioxide and further containing a carbon filament which is provided with an electrical connection to the outside of the tube, whereby an electrical heating current is applicable to the filament.

2. A tube according to claim 1, wherein the carbon filament constitutes one of the

main electrodes to which a high voltage is applied in operation of the tube.

3. A tube according to claim 1, further containing a source of oxygen having an electrical connection to the outside of the tube.

4. A tube according to claim 3, wherein the oxygen source is in the form of a filament.

5. A tube according to claim 3 or 4, wherein the oxygen source comprises potassium chlorate.

6. A discharge tube substantially as hereinbefore described with reference to the drawing accompanying the provisional specification.

7. A carbon monoxide/carbon dioxide detector comprising a discharge tube according to any preceding claim.

R.G. MARSH,  
Chartered Patent Agent,  
Agent for the Applicants.